

**P-3.5 Explain the factors involved in producing a change in momentum (including impulse and the law of conservation of momentum in both linear and rotary systems).**

Revised Taxonomy Levels 2.7 B Explain conceptual knowledge

**Key concepts**

Law of conservation of momentum

Rotary motion

Students did not address the principles of momentum in physical science

**It is essential for students to**

- ❖ Understand that momentum is the product of the mass of the moving body and its velocity.
  - the symbol for momentum is “p”
  - $p = mv$
- ❖ Understand that the momentum of an object can be changed by a force applied over time. The longer that a force is applied to an object, the more the momentum of an object will change.
  - The product of force and the time interval during which it acts ( $F\Delta t$ ) is called impulse
  - Impulse = change in momentum
  - $F\Delta t = m\Delta v$
- ❖ Explain rotational inertia
- ❖ Explain the law of conservation of momentum in linear and rotary systems.

**Assessment**

The verb explain means that the major focus of assessment should be for students to “construct a cause and effect model”. In this case, assessments will ensure that students can model how force exerted over time affects the momentum of familiar objects. Because the indicator is written as conceptual knowledge, assessments should require that students understand the “interrelationships among the basic elements within a larger structure that enable them to function together.” In this case, assessments must show that students can construct a cause and effect statement relating how each variable (force, and time) affect the motion of the object.